ANALYSIS OF DISMS INCREMENT IV

- WORKLOAD CAPACITY
- BID RESPONSE PROCESS
- ON-LINE INQUIRIES

Operations Research and Economic Analysis Office

DEPARTMENT OF DEFENSE
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This report brings together in one document the findings of a series of three studies concerned with Increment IV of the Defense Integrated Subsistence Management System (DISMS). This evaluation of Increment IV spanned more than 15 months and progressed from a general overview to more in-depth examinations of the two major Increment IV processes. Each analysis, in turn, has provided different perspective on DISMS and revealed new, more detailed, information. Findings included: expected transaction rates for on-line inquiries and bid response evaluations; workload implications of the bid response data entry; and rationale supporting an on-line system based on real time management information needs.

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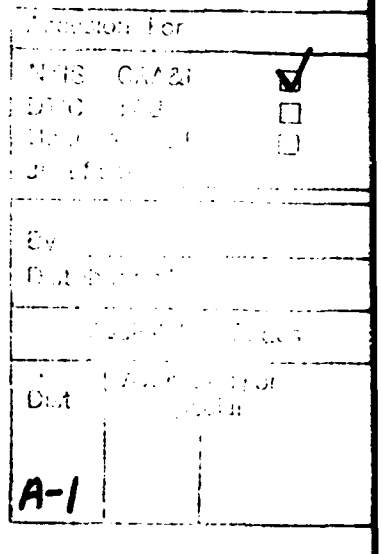

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DLA-LO

FOREWORD

This report brings together in one document the findings of a series of three studies concerned with Increment IV of the Defense Integrated Subsistence Management System (DISMS). This evaluation of Increment IV spanned more than fifteen months and progressed from a general overview to more in-depth examinations of the two major Increment IV processes. Each analysis, in turn, has provided a different perspective on DISMS and revealed new, more detailed, information. In some cases, changes to previous study findings have resulted.

Although two of these studies have been reported on previously, it is believed that this document provides the best assessment now available relative to the impact of Increment IV on Defense Personnel Support Center computer and personnel resources. Accordingly, this report replaces previous reports on DISMS Increment IV prepared by the DLA Operations Research and Economic Analysis Office.

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Policy and Plans

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I. INTRODUCTION

A. Background

Increment IV of the Defense Integrated Subsistence Management System (DISMS) has been the subject of a series of three studies sponsored by the DLA Office of Telecommunications and Information Systems (DLA-Z) and performed by the DLA Operations Research and Economic Analysis Office (DLA-LO).

The first two studies have been reported on previously and the third study, which addressed the area of on-line contracting inquiries, is now complete. Rather than prepare a separate report on the inquiries study, a different approach seems more appropriate. Over one year has elapsed since the initiation of this series of studies and each successive analysis has revealed additional information which has raised new issues and resulted in modification of previous findings.

It is, therefore, the purpose of this report to bring together in one document the findings of all three studies in order to facilitate understanding of the scope, objectives and results of our overall examination of DISMS Increment IV.

B. Workload Capacity

DISMS is an automated data system being implemented by the Defense Personnel Support Center (DPSC). Increment IV of DISMS will provide real time computer processing capability to the major subsistence contracting functions and is scheduled for implementation beginning in the second quarter of FY 88.

In anticipation of significant on-line workload increases resulting from Increment IV, DLA-Z decided, in the latter part of 1986, to purchase a new computer mainframe for DISMS. In making this decision, DLA-Z considered the results of computer sizing analyses conducted by the DLA Systems Automation Center (DSAC). Using simulation models, DSAC had concluded that the addition of Increment IV would completely saturate the existing production mainframe. Although this conclusion was accepted and procurement of a new computer was initiated, the exact size of the computer needed for DISMS remained in doubt due to concerns about the simulation model results. The major question was the accuracy of certain transaction volume estimates being used as input to these models.

The DISMS Workload Capacity Study, April 1987, provided transaction volume estimates for use in the DSAC computer sizing analyses. That study indicated that two key contracting processes could create unacceptably high and concentrated demands on the DISMS computer. Accordingly, DLA-Z requested DLA-LO to perform detailed studies of the DISMS bid response and on-line inquiry processes.

C. Bid Response Process

The DISMS Bid Response process will consist of two major activities: recording of offers and bid evaluation. Increment IV management requirements call for real-time capability to record vendor offers and an automated bid evaluation process which has a maximum turnaround time of 30 minutes. Although it will be possible to bypass the automated bid evaluation process (e.g., only recording successful vendor offers), it is now management policy that all vendor offers will be entered into DISMS prior to obtaining hard copy contracts.

The amount of time available between the closing of solicitations and the awarding of contracts can have a significant impact on computer utilization. Current subsistence contracting procedures require that contracts for perishable items be awarded within a few hours of solicitation closing. Such short turnaround times have the potential to create peak periods of demand on the DISMS computer which could reduce system responsiveness and limit the computer's ability to absorb future growth.

D. On-Line Inquiries

As a result of the implementation of the first three increments of DISMS, there is currently limited capability for on-line inquiries against certain subsistence files. These include the active contract file and the vendor file. When Increment IV is operational, more ways to access these files will be provided. In addition, several new files with inquiry capabilities will be created. This group includes the Purchase Request (PR) file and the Solicitation file. Because of concerns about Increment IV computer utilization, questions have been raised as to whether on-line capability is necessary or appropriate for all inquiry applications. Also, since the DISMS data base management system (TIS) requires large amounts of computer time, it may be desirable to perform certain transactions outside of the TIS environment.

E. Study Objectives

The objectives of this series of studies developed gradually over the course of our involvement. Initially, our major purpose was to identify the types and frequencies of real time computer transactions resulting from Increment IV. Once the transaction estimates were developed, we were then concerned with converting that data into a format that could be utilized by the DSAC computer sizing models.

When initial findings indicated that bid response activities and on-line inquiry applications could have a significant impact on computer utilization, our objectives became broader in scope. The major purpose of our follow-on studies was to determine if the bid response and on-line inquiry processes would result in the efficient and effective use of computer and personnel resources. This required the examination and

evaluation of DISMS management requirements, DISMS systems design and DPSC subsistence contracting practices. In analyzing bid response activities, a special effort was made to examine the time period utilized for the recording of vendor ofiers. For on-line inquiries, consideration was given to the feasibility of alternatives to the use of the DISMS data base management system (TIS) for selected inquiries.

II. CONCLUSIONS

A. The implementation of DISMS Increment IV will result in the addition of an estimated 133,123 real time transactions per month. Those transactions are projected to generate an additional 4800 enter-key depressions (EKDs) per hour during the peak operating periods of the DISMS computer system.

B. The two largest Increment IV activities are the On-Line Inquiry and Bid Response processes. It is estimated that these two processes will account for 85 percent of the Increment IV transactions and 81 percent of the Increment IV computer system throughput (enter-key depressions).

C. Ninety percent of the DISMS bid response workload in the perishable item procurement branches will occur on Mondays through Thursdays between the hours of 1:00 p.m. and 3:00 p.m. It is also estimated that two thirds of the on-line inquiries against the Active Contract and PR files will occur on Monday through Wednesday. These facts should be taken into consideration in any future DSAC computer sizing analyses.

D. Additional time and effort probably will be required to enter vendor offers into DISMS. Accordingly, user acceptance problems may develop. The degree of acceptance will likely depend on whether the benefits of the automated bid evaluation process are perceived to offset this additional workload.

E. The needs of the typical Increment IV user for timely, accurate data justify the provision of real time capability for most of the major Increment IV inquiry processes examined in this study.

F. Decisions must be made soon regarding the extent to which aggregated, summary information from the DISMS data base will be provided to subsistence managers. Given that a DISMS query capability will not be available, alternatives for providing this information range from running batch inquiries on the DISMS mainframe to downloading selected DISMS data to another device or system.

G. The transaction volume and EKD projections provided in this report represent our best estimates, at this time, of the impact of DISMS Increment IV. These estimates have evolved as this series of studies progressed from a general overview of Increment IV to a more in-depth examination of the two major Increment IV processes. Realistically, however, these projections are only estimates and the exact impact of Increment IV will not be known until the system is operational.

III. RECOMMENDATIONS

A. This series of studies has identified a number of subsistence procedures and practices that will contribute to the development of peak demands on the DISMS computer. If it becomes necessary to reduce or redistribute computer workload, it is recommended that the following measures be considered:

1. Schedule more solicitation closings on Mondays in semi-perishables and Fridays in perishables.

2. Restrict the recording of offers into DISMS between 1:00 p.m. and 3:00 p.m. to those employees in the perishables branches.

3. Authorize manual bid evaluations to be made for relatively uncomplicated bids.

4. In conjunction with manual evaluations, allow recording of offers into DISMS to occur after award decisions are made.

B. Implement a system for accessing the DISMS data base for aggregated summary information. That system should consist of batch inquiry capabilities (other than the current special request procedures) and/or the capacity to query the DISMS data base by downloading selected information to another system or device.

IV. TECHNICAL APPROACH

The general approach used in this series of studies consisted of the review of DISMS requirements and specifications and the development and analysis of data and other information describing the subsistence contracting workload. Contracting management requirements were obtained from the DISMS project office (DPSC-HJ) and evaluated to determine if they represented valid user needs and provided practical methods for obtaining desired management information. DISMS systems design specifications were obtained from DSAC Subsistence Management Systems (DSAC-V) and analyzed for consistency with management requirements and user needs. In addition, extensive interviews were conducted with subsistence contracting personnel to gain familiarity with current procedures and practices.

Our initial efforts to estimate Increment IV transaction volumes revealed the need to develop a set of working definitions (see Appendix A) to ensure that our projections consisted only of user-performed tasks and did not include system-generated activities or processes requiring no direct user intervention. Conversion of this transaction data into usable computer sizing model input required numerous meetings with DSAC-V functional analysts who designed the various Increment IV processes. With the help of these analysts, estimates were developed for the number of terminal display screens a user would require to perform each type of transaction.

In the analysis of bid response activities, actual observations were made of buyers and procurement clerks performing such tasks as manual recording of offers, manual bid evaluation and recording of awards into the Perishable Subsistence Automated Supply System (PSASS). In addition, a survey of buyer activity in the perishable item branches was conducted to document the types of transactions being performed as well as the time of day these transactions occurred.

To facilitate the examination of on-line contracting inquiries, a "panel of experts" was created to serve as a resource for the project analysts. This group consisted of 14 people representing the subsistence divisions of Contracting, Supply, Technical, Quality Assurance, Comptroller and Plans and Programs. The study group provided invaluable assistance in the validation of inquiry transaction volume estimates, the identification of user information needs and the evaluation of inquiry menu/screen designs.

V. ANALYSIS

A. Transactions Volumes

Final Increment IV transaction volume estimates are provided in detail in Table 1 and are summarized below. More than 60 percent of these transactions will be on-line inquiries and the combined Bid Response and On-Line Inquiry processes will account for 85 percent of the total monthly volume.

Type of Transaction	Estimated Volume Per Month
Bid Response Process	29,095
On-Line Inquiries	84,476
Other Increment IV	19,552
Total	133,123

The development of these estimates was an evolutionary process which progressed as described in subsections A.1 through A.3 below:

1. DISMS Workload Capacity Study (October 1986-April 1987). The Workload Capacity Study produced a total estimate of 196,440 real time Increment IV transactions per month. The Bid Response and On-Line Inquiry processes together were projected to account for 90 percent of those transactions. A large Bid Response volume projection of 148,540 monthly transactions was based primarily on a key estimate of 500 real time solicitations per month. Those solicitations were predicted to generate 980 closings (or bid openings) each month. It was further estimated that each solicitation closing would average ten line items and ten vendor offers per line. As described in subsection A.2 below, those key statistics were substantially modified on the basis of information obtained in the subsequent, more detailed, analysis of the Bid Response Process.

Table 1

TRANSACTION VOLUME ESTIMATES FOR DISMS INCREMENT IV

Real Time Transactions

Type of Transactions		Volume Per Month
I.	Basic Agreements	1,395
II.	Generate Awards	(Included in III Below)
III.	Pre-Post Pending Awards	9,555
IV.	Post-Post Pending Awards	2,825
V.	Process Funds	300
VI.	Print Hard Copy	(Included in III Above)
VII.	Bid Response	29,095
VIII.	Inquiries	84,476
IX.	Maintenance	700
X.	Pending Amendments	370
XI.	Pre-Solicitation	2,070
XII.	Pending Solicitations	502
XIII.	RACER	120
XIV.	Realtime Recommended Buys	1,715
	TOTALS	133,123

2. DISMS Bid Response Evaluation Analysis (March 1987 - October 1987). Initial fact finding efforts during our first follow-on study led us to conclude that Bid Response transactions generated from perishable item buys would be concentrated during the afternoon. It was decided, therefore, to conduct a survey of buyer activity in those areas to document the time of day the various perishables bid response activities occurred. Accordingly, during a two week period, the perishable item buyers recorded 74 solicitation closings, 530 lines solicited, 500 vendor offers and 369 contracts awarded. Analysis of those results led us to conclude that perishable item closings would only average about 200 per month. A closer examination of all subsistence solicitation activity resulted in a revised total estimate of 315 closings per month. In addition, estimates of offers per closing and lines offered were reduced. Those findings resulted in a substantially lower Bid Response transaction volume estimate of 29,095 per month. On that basis, a revised total Increment IV transaction volume estimate of 77,310 per month was computed and the original transaction estimates were amended accordingly. Those amended transaction estimates were forwarded to the study sponsor on 5 August 1987.

3. DISMS On-Line Inquiry Analysis (September 1987 - December 1987)

Our most recent follow-on study focused on the eight major On-Line Inquiry applications that were projected to account for 99 percent of monthly subsistence contracting inquiry transactions. Those applications are:

- Active Contract File
- Solicitation File
- Pending Contract File
- Purchase Request File
- Vendor Performance History File
- Supply Bulletin File
- Vendor File
- Summary of Offers File

The DISMS Workload Capacity Study had indicated that these eight applications would generate 28,000 transactions per month. All other inquiries combined were projected to account for only 348 transactions per month. Those estimates were based primarily on an assumption of no more than 200 users of these inquiry applications.

In performing a more in-depth examination of inquiry applications, the project analysts sought the assistance of the DISMS study group referenced in Section IV of this report. These individuals estimated the frequency of use for those Inquiry applications that would be utilized regularly by their respective organizations. In addition, the study group was asked to gauge the number of Inquiry users in each major subsistence division or branch. The results of that effort, which are summarized in Table 2, predict a much higher utilization of the various inquiry processes than was previously anticipated. The eight major applications are now expected to generate 84,128 transactions per month. This substantial increase is primarily due to the fact that the number of users is now projected to be nearly 400, twice the original estimate. Additionally, each user is now projected to average about ten inquiries per day compared to the original estimate of approximately six per day.

The last three columns in Table 2 were intended to provide the DISMS study group with information they could use to assess the reasonableness of their transaction estimates. The computations of average minutes per day were developed by applying a manhour standard of three minutes per inquiry (see Appendix B for explanation). Based on this standard, each user will average approximately one-half hour per day on inquiry tasks alone.

In developing the last column of Table 2, we make an assumption, for the sake of discussion, that specific DISMS terminals would be reserved for inquiry tasks only. Given that premise, a total of 42 terminals would be required in the six major subsistence divisions to perform the estimated volume of on-line inquiry transactions.

The DISMS study group has considered these computations of average minutes per user and terminals required and has concluded that the transaction volume estimates shown in Table 2 are reasonable.

TABLE 2

ANALYSIS OF DISMS INCREMENT IV ON-LINE INQUIRIES

	INQUIRIES PER USER PER DAY														
DIVISION	CONT	(1) SOLIC	(2) PEND CONT	(1) PR	(1) VEND PERF HIST	(1) SUPP BULL	(1) VEND	SUMM OF OFFS	(3) USERS	AVG INQUIRIES PER USER PER DAY	TOTAL INQUIRIES PER DAY	TOTAL INQUIRIES PER MONTH	AVG MINUTES PER DAY	AVG MINUTES PER USER PER DAY	(4) TERMINALS REQUIRED FOR INQUIRIES ALONE
CONTRACTING															
PERISHABLES	2	1			2				27	5	135	2970	405	15	2
SEMI-PERISHABLES	2	2	2	2	2		2	2	60	14	1260	27720	3780	42	13
BRAND NAMES	5		1		2	5	3		60	16	960	21120	2880	48	10
SUB-TOTAL									177		2355	51810	7065	40	25
SUPPLY OPERATIONS															
PERISHABLES	2	1		5		0.5	0.5		45	9	405	8910	1215	27	4
NON-PERISHABLES	2	1		5		0.2	0.2		85	8.4	714	15708	2142	25	8
SUB-TOTAL									130		1119	24618	3357	26	12
COMPTROLLER															
PR INQUIRIES				0.4					2	0.4	1	18	2	1	
OTHER INQUIRIES	3				0.2	0.2	0.2		15	3.6	54	1188	162	11	
SUB-TOTAL									15		55	1206	164	12	1
TECHNICAL	1	1		2					30	4	120	2640	360	12	2
QUALITY ASSURANCE	2	0.5		0.5	0.5		0.5		40	4	160	3520	480	12	2
PLANS & PROGRAMS	4			4					2	8	16	352	48	24	1
TOTALS									394		3824	84128	11472	29	42

TABLE NOTES: (REFER TO APPROPRIATE COLUMN(S))

(1) FRACTIONAL USAGE FREQUENCIES ARE USED TO INDICATE LESS THAN ONE INQUIRY PER USER PER DAY.

(2) ASSUMES PENDING CONTRACT INQUIRIES ARE AVAILABLE ONLY TO CONTRACTING PERSONNEL.

(3) THE 15 TOTAL USERS IN COMPTROLLER INCLUDES THE TWO USERS OF PR INQUIRIES.

(4) ASSUMES THAT 80 PERCENT OF ALL INQUIRIES OCCUR DURING A FOUR HOUR PERIOD OF EACH DAY.

B. Recording of Offers

Concerns about the apparent high volume and concentrated nature of the subsistence bid response workload led to our follow-on analysis of that process. A major objective was to determine if the terminal display screens and menus to be used for recording vendor offers into DISMS would promote the efficient use of personnel and computer resources.

It was concluded, as a result of this examination, that the DISMS recording of offers process would increase procurement clerk workload in the perishable subsistence branches. This increase will occur primarily because contracting management requirements for DISMS call for all vendor offers to be entered in the system before hard copy contracts are created. This constitutes a significant change from current procedures. All perishable item bid evaluations are now done manually and only awards, not offers, are recorded into PSASS.

Secondly, the current system design requires a separate terminal display screen to enter each combination of vendor offer and line item. Accordingly, it can be seen that multiple screens will be required to record into DISMS the same offer information that a buyer now records manually on a single hard copy "abstract of offers" document.

It is true that, because of its vendor oriented design, the DISMS recording of offers process can facilitate the entry of complicated bid information (e.g., tie-ins, all or none, etc.). Such bids are not unusual in the semi-perishable subsistence branches. However, the process of recording the relatively uncomplicated offers received on perishable item solicitations will probably be perceived by those users as much too lengthy and cumbersome.

C. Accessing the DISMS Data Base

1. Design of Screens and Menus

A major task of the DISMS study group was evaluation of the On-Line Inquiry system design from a user perspective. Nearly 80 screens and menus, taken from the Functional Description for the eight largest inquiry applications, were examined in detail. The group members first identified typical types of inquiries (e.g., resolving financial questions, determining status of a contract or PR) that would be made by the users in their respective areas. The number of screens that would be required to complete those inquiries were then determined.

In simulating inquiries in this manner, the resource group was asked to assess the relative ease or difficulty a user would have in obtaining needed information from the various inquiry applications. Although the inability to scroll backward in certain inquiry processes was mentioned as an occasional hindrance, the general concensus was very positive. It is, therefore, concluded that the on-line screens and menus, as currently designed, will facilitate the accomplishment of information gathering and other contract related tasks by DPSC subsistence users.

2. Need for Current Status Information

Because of the large volume of transactions now projected, it is possible that Increment IV on-line inquiries will place unacceptably high demands on the DISMS computer. It is important, therefore, that the provision of real time inquiry capability be consistent with the information needs of subsistence users. Our analysis of the eight major Increment IV inquiry processes indicates that the need for timely, accurate data justifies real time capability for the majority of these applications. This conclusion is based on advice and comment from the DISMS study group regarding user information needs as well as our own observations of contract processing tasks and related activities.

The typical Increment IV inquiry will be made to determine the current status of a specific document record such as a contract or PR. Because of the dynamic nature of the contracting process, the status of these records will change on a daily and even hourly basis. Of the eight major inquiry application files, only the Vendor File and the Vendor Performance History File normally would not be subject to such rapidly changing status. That is because these two files will primarily contain general descriptive data and/or historical information on vendors.

A substantial number of inquiries will involve comparing one type of record to another (e.g., cross-referencing of PR and active contract records). A significant portion of these inquiries will be prompted by a need to resolve discrepancies in financial data. Because such information is usually needed to determine the next course of action, the DISMS user will normally require an answer to his or her inquiry as soon as possible. For example, the current status of a PR may determine whether an inventory manager decides to initiate a new buy action, modify the existing PR or cancel a buy. It may also determine whether a buyer creates a new solicitation or amends an existing one. In today's batch environment, these kinds of decisions are often made only after numerous telephone calls between Contracting and the other subsistence divisions such as Supply, Technical or the Comptroller.

3. Need for Summary Performance Data

Just as buyers and inventory managers need to know the current status of contracts and PRs to do their jobs effectively, subsistence managers need reliable, aggregated information on the overall operation of their sections, branches or divisions. Such information, especially Active Contract File (ACF) data, is essential if these managers are to accurately measure productivity, effectively manage workload, assess responsiveness to customer needs and, in general, evaluate the performance of their organizations.

Under normal circumstances, a user could obtain this kind of aggregated data from a system like DISMS either using predesigned summary inquiries, or by performing ad hoc queries. Increment IV users, however, may have neither of these capabilities.

The Functional Description for Increment IV indicates that the following summary inquiries against the ACF will be available:

- Contracts by ORC (Buyer)
- Contracts by Type of Business Code
- Contracts by Type of Procurement
- Contracts by Procurement Instrument
- Contract Information by Consignee

The selection of these inquiries would be accomplished on-line from the ACF Inquiry Menu although the actual inquiry would be processed in a batch mode. Unfortunately, plans to provide these options were based on certain assumptions about software availability and data base management system (DBMS) design that are no longer valid. Apparently, with the current DBMS design, processing of these batch inquiries will require a sequential read of every record in the ACF. DSAC-V has concluded that this would extend overnight batch processing and lead to batch overruns and reduced system availability. Therefore, rather than offering these batch inquiries as options available to any DISMS user on the ACF Inquiry Menu, DSAC-V has stated their intention to require these inquiries to be handled as special program requests. Such requests would be submitted on an individual basis and would have to be approved through subsistence management channels (see Appendix C).

From discussions with the DISMS study group, it is evident that the typical DISMS user (e.g., buyers, inventory managers, quality assurance specialists) will have little or no need for these batch inquiries. However, this is the kind of information that subsistence management should have available for decision-making and performance evaluation purposes. There is no doubt that DSAC-V's concerns about potential batch overruns are legitimate, particularly if these inquiries are used indiscriminately. On the other hand, concerns expressed by members of the DISMS study group about the current special request process indicate that DSAC-V's approach will not provide a satisfactory means for obtaining this information. Thus, the question becomes, "What viable alternatives exist for providing the types of summary data needed for effective management and decision-making?".

One possible way to retain the ACF batch inquiries would be to limit access to certain managers. Another alternative could be to require that these inquiries only be made on Fridays and processed over the weekend. A third option might involve the production of hard copy reports on a regular basis in lieu of certain batch inquiries.

Apparently, one alternative that will not be available to Increment IV users will be the capability to make ad hoc inquiries using a high level query language. Although technically feasible through the use of TIS Query, such capability will not be provided due to the heavy demands it would place on available computer resources. Accordingly, if DPSC subsistence personnel are to have any query capability at all, it will have to be provided outside of DISMS. This would entail the periodic downloading of selected data base records (primarily ACF data) from DISMS to flat file storage either on the DISMS mainframe or on some other mainframe or mini-computer system. The advantage of downloading to a

mainframe device is the larger storage space that would be available. The disadvantage of this option is that rather complex user programs would undoubtedly have to be written in languages such as COBOL or FORTRAN each time specific questions needed to be answered. Conversely, a system such as DLA's Distributed Mini-Computer System (DMINS) offers the advantage of a built-in DBMS with associated query capability. Using DMINS, however, means that storage space becomes the major limiting factor and only a very select set of information could be extracted from any given DISMS file.

In summary, DISMS will contain a wealth of information which, in aggregated form, would be extremely useful to DPSC Subsistence management. Decisions must be made soon regarding the extent to which such data will be provided to those managers. In so doing, it must be assumed that a DISMS query capability will not be available. Additionally, the implementation of ACF batch inquiries with unlimited access is no longer realistic. Consequently, other alternatives for obtaining these types of data should be evaluated by Subsistence management. Those alternatives range from restricting access to ACF batch inquiries to provision of a limited ad hoc query capability by downloading selected DISMS data to another device or system.

The choice of a proper course of action will essentially involve an economic analysis comparing the costs and benefits of that action. Admittedly, the benefits that will accrue from having a better data base for decision-making, although real, will be less tangible than the costs of providing that data base. Obviously, those costs will include any reduction in system availability that may result from batch overruns. Such overruns could result from either batch inquiries or downloads from DISMS to another device or system. There could also be substantial programming costs associated with any effort to provide summary data. In addition, the fact that these programming resources would not be available for other tasks could result in costly delays in DISMS implementation. Because of the intangible nature of the benefits associated with an improved data base, its development may, at first glance, seem very costly. However, the future costs that might result from poor planning or bad decisions because this data is not available could be even greater.

D. Computer System Throughput

1. Bid Response Workload

Our survey of perishable item buyer activity confirmed that a significant peak Bid Response workload will exist under DISMS Increment IV and it will be generated in the perishables branches during a two hour period of each afternoon.

At least two-thirds of the Bid Response transactions will occur in perishables. Even though solicitation closings in perishables will occur at both noon and 1:00 p.m., actual bid evaluation activity will normally not begin before 1:00 p.m. because of the time needed for lunch breaks and/or manual recording of offers. According to the survey, 97 percent of perishable item contract award decisions will be made by 3:00 p.m.

The survey also confirmed that Bid Response Process is essentially a four day per week activity. In the perishables branches, Fridays are usually reserved for administrative tasks. Similarly in semi-perishables, virtually no closings occur on Mondays. Accordingly, subsistence Bid Response activities will be concentrated on Tuesdays, Wednesdays and Thursdays, further contributing to the creation of peak workload levels.

2. On-Line Inquiry Workload

DISMS currently provides a somewhat limited capability to make on-line inquiries against the ACF. Users may now inquire by contract number (PIIN), line item number (CLIN) or call-delivery order. During the seven-week period of 14 September 1987 through 31 October 1987, DSAC-V monitored the actual volume of these inquiries. Because of system downtime, etc., the equivalent of six weeks of observations were made.

The data obtained from this survey revealed that the current On-Line Inquiry process is used six days per week (Monday through Saturday). During the survey, an average of 200 inquiries were made per day for a monthly average of 5200 (based on six-day weeks). As expected, this figure is significantly below the volume of ACF inquiries projected for Increment IV. Increment IV will provide more ways to access the ACF and more people will be spending more time "on" DISMS as it replaces current systems like ASPSS and PSASS.

Perhaps the most useful information provided by the survey pertains to the patterns of ACF inquiry usage. Nearly two-thirds of the inquiries monitored occurred on Monday, Tuesday and Wednesday. This is consistent with other study findings such as the practice in perishables of not awarding contracts on Fridays. It seems reasonable to assume, therefore, that this pattern will continue under Increment IV. It also seems reasonable that the PR inquiry process, when implemented, will follow the same pattern since a large portion of PR inquiries will be made for the purpose of cross-referencing to contract records.

3. Computer Sizing Considerations

As previously noted, a major objective of this series of studies was the development of input data for the DSAC computer sizing models. This required converting the monthly transaction volume estimates for Increment IV into enter-key depression (EKD) counts. These EKD estimates were based on the most likely number of terminal display screens required to perform each specific transaction.

Table 3 provides monthly EKD estimates for the major Increment IV processes. Total Increment IV EKDs are projected to be 417,850 per month. This equates to an average of 2374 EKDs per hour based on 22 workdays per month and eight hours per day. However, DSAC's computer sizing models are concerned with a "peak" hourly workload. For many Increment IV transactions, the development of peak workload estimates has been based on the assumption that 80 percent of the daily workload will occur Monday through Friday during a four-hour period (i.e., 9:00 - 11:00 a.m. and 1:00 - 3:00 p.m.). However, as discussed in sub-sections D.1 and D.2 above, this assumption does not apply to the perishable item Bid Response process

or to on-line inquiries made against the ACF and PR files. Perishables bid response transactions will be concentrated on Monday through Thursday between 1:00 p.m. and 3:00 p.m. Two-thirds of the on-line ACF and PR inquiries are projected to occur on Monday through Wednesday.

Table 3

ENTER-KEY DEPRESSION (EKD) ESTIMATES FOR DISMS INCREMENT IV

Real Time Transactions

Type of Transaction		EKDs Per Month
I.	Basic Agreements	2,688
II.	Generate Awards	(Included in III Below)
III.	Pre-Post Pending Awards	43,515
IV.	Post-Post Pending Awards	5,650
V.	Process Funds	600
VI.	Print Hard Copy	(Included in III Above)
VII.	Bid Response	43,424
VIII.	Inquiries	303,771
IX.	Maintenance	5,130
X.	Pending Amendments	1,005
XI.	Pre-Solicitation	2,310
XII.	Pending Solicitations	4,252
XIII.	RACER	360
XIV.	Realtime Recommended Buys	5,145
	TOTALS	417,850

With these facts in mind, a peak hourly workload for Increment IV of 4800 EKDs is computed (see Appendix D). This is significantly larger than the 3875 EKDs used by DSAC in June 1986 when it concluded that an AMDAHL 5860 CPU would be required to accommodate Increment IV and allow for sufficient workload growth.

It should be emphasized that the largest portion (68 percent) of this peak hourly workload estimate is attributable to on-line inquiries. Since these transactions will consist only of information displays and will not involve updates to files or registers, they will not be as complex as other transactions (i.e., bid evaluations, release of contracts) from a computer utilization standpoint. Accordingly, this larger peak EKD estimate may not necessitate a significant change in previous DSAC findings.

APPENDIX A

Working Definitions

Early in the process of developing Increment IV transaction estimates, it became obvious that prior efforts to develop data of this type had been hampered by the lack of a consistent definition of a transaction. Consequently, previous transaction estimates consisted of a mixture of user-performed tasks and system-generated activities ranging from individual terminal displays to entire contracting processes. Therefore, it was essential to develop a working definition of a transaction. It also was decided that a transaction should be defined from a functional perspective rather than a system-perspective. This meant that, to the extent possible, transactions could be defined in terms of historical data (e.g., number of contracts, solicitations, etc.) therefore enabling some assessment to be made of the reasonableness of these estimates. Accordingly, the definitions of the major terms associated with this data collection effort are as follows:

1. Transactions are activities requiring on-line user intervention in order to establish, modify, review, release, print or delete records or files. As such, transactions do not include system-generated activities which occur automatically and require no user intervention other than a single depression of the enter-key or a function key. Accordingly, transactions include such activities as establishing Blanket Purchase Agreements, releasing pending contracts and performing a solicitation response inquiry. Transactions would not include, however, the system-generated updates of contract files, vendor history files, or item history files that occur automatically when a pending contract is released.

Obviously, those transactions which cause other system-generated activities, such as file updates, to occur are more complex and require more computer time to perform than would a simple inquiry or display of data. Accordingly, the difference in complexity of the various Increment IV transactions is programmed into the logic of the computer sizing models and need not be duplicated in the count of Increment IV transactions.

2. Enter Key Depressions (EKDs) are calculated (for computer sizing purposes) by multiplying the transaction volume by the number of terminal display screens required to perform the transaction.

APPENDIX B

Manhours Per On-Line Inquiry

The DLA Performance Standards Support Office (DPSSO) establishes manhour standards for all DLA activities. Because DISMS Increment IV is not yet operational, however, no standards have been established for those processes.

A review of available information has identified a manhour standard for making on-line inquiries in the Mechanization of Contract Administration Services (MOCAS) system. This standard is considered to be acceptable as a surrogate for DISMS on-line inquiries since both MOCAS and DISMS Increment IV involve contract-related tasks and both systems access files that are created using the Total Information System (TIS) data base management system.

The MOCAS standard chosen can be found as elements of the following DPSSO standards.

Element	DPSSO Standard Number	Name	Standard Hours	Standard Minutes
E	5221	MOCAS Modification Input Processing	.0501	3.01
B	5222	MOCAS Correction Processing	.0501	3.01

APPENDIX C

DSAC-V Letter of 9 October 1987,

Subject: DISMS Contract File Inquiries

DEFENSE LOGISTICS AGENCY
SYSTEMS AUTOMATION CENTER
SUBSISTENCE MANAGEMENT SYSTEMS
P.O. BOX 8529
PHILADELPHIA, PA 19101-8419

OCT 9 1987

REPLY
REFER TO DSAC-V (Mr. Mish/4615/gs)

SUBJECT: DISMS Contract File Inquiries

TO: Commander, DPSC
ATTN: DPSC-HJ

1. The original Management Requirements for Contracting and Production defined certain types of contract inquiries that were to be included in DISMS. In the Functional Description that followed, some of these inquiries were proposed to be processed in a batch mode while others were proposed as real-time applications.

2. The batch proposals were based on the assumption that TIS Query was a viable software alternative that could be used for as-required requests. Because the Query language is based upon pre-existing linkages within the data base, these inquiries were never implemented as part of Increment 1 but were deferred for future implementation. In order to now process these batch inquiries, technical considerations mandate that every record in the Contract Store would have to be read to satisfy such requests. As the Contract Store has grown considerably since Increment 1, this would result in extending the overnight batch processing and could lead to batch overuns and reduced system availability.

3. It is because of this negative impact and the fact that these batch inquiries are not of a production nature, that we believe they can be better handled through, and intend to provide for them as, special program requests submitted through Subsistence management channels. This procedure will also enable Subsistence management to evaluate the necessity of such requests and to control the use of the computer resource.

4. In addition to the above batch inquiries, three real-time inquiry applications, namely inquiry by Stock Number, Purchase Request Number and Vendor code, were also deferred for future implementation. We suggest that the Stock Number inquiry can be more efficiently accomodated by an Active or Inactive Item Procurement History Inquiry which is part of the DISMS Increment IV design. As requirements from one area may have been satisfied by overlapping design, as in the case of the Stock Number inquiry, it is believed a review by your office, to see if the

real-time inquiries are still valid requirements, would be timely. The review may prevent unnecessary programming where another inquiry already provides for the requirement.

FOR THE COMMANDER:

Encls

for Francis M. Baggett
WILLIAM F. VANORE
Director
Subsistence Mgmt Systems

cc: DLA-ZSM

APPENDIX D

Computation of Peak Hourly Workload

(EKD) Estimates for Increment IV

A. Assumptions

1. There are 417,850 Total Increment IV EKDs per month.

2. There are 31,670 Perishables Bid Response EKDs per month.

3. 90% of Perishables Bid Response EKDs will occur on Monday through Thursday or 18 days per month.

4. Peak Perishables Bid Response EKDs will occur in a 2 hour period (1:00 p.m. through 3:00 p.m.).

5. There are 152,770 ACF and PR on-line inquiry EKDs per month.

6. 64% of ACF and PR on-line inquiry EKDs will occur on Monday through Wednesday or 13 days per month.

7. 80% of the remaining Increment IV EKDs will occur during a 4 hour period of each day, 5 days per week or 22 days per month.

B. Computation

Total-Peak = Peak-PBR + Peak-OLI + Peak-RIV

Where Peak-PBR = Peak EKDs for Perishables Bid Response Transactions

Peak-OLI = Peak EKDs for ACF and PR On-Line Inquiries

Peak-RIV = Peak EKDs for Remaining Increment IV Transactions

$$\text{Peak-PBR} = .90 \frac{[31,670]}{18} / 2$$

$$= 792$$

$$\text{Peak-OLI} = .64 \frac{[152,770]}{13} / 4$$

$$= 1880$$

$$\text{Peak-RIV} = .80 \frac{[233,410]}{22} / 4$$

$$= 2122$$

Total-Peak = 4794 or 4800 EKDs/hour

DEFENSE LOGISTICS AGENCY

Inter-Office Memorandum

8 FEB 1988

IN REPLY REFER TO DLA-XP (Miss Childress/PAVMARC/46005)

SUBJECT: Request for Exemption - Analysis of DISMS Increment IV: Workload Capacity, Bid Response Process, On-Line Inquiries

TO: DLA-LO

1. Reference DLA-LO IOM, 29 Jan 1988, same subject.

2. A review of the above reference has determined that this is basically a statistical report, therefore not subject to the quidelines on pamphlets/periodicals. Neither OSD nor PAVMARC approval is required.

3. Copies of this letter should be retained in your files and forwarded to your Printing Control Officer along with your request for reproduction.

W. DAVID KERLIN
Chief, Publications Division
Office of Administration